What is claimed is:

1. An apparatus, comprising:

a programmable pulse generator; and

at least one sensor, coupled to the programmable pulse generator, to sense a plurality of cardiac events,

wherein the programmable pulse generator is adapted to:

measure a first time interval between a first cardiac event and a second cardiac event that has an approximately constant timing relationship with respect to the first cardiac event and a predictable timing relationship to a delivery of pacing timed for maximizing aortic pulse pressure;

determine a delay time interval referenced to the first cardiac event using a predetermined mapping relationship of the first time interval to an approximately optimal delay time interval for maximizing aortic pulse pressure; and

transmit pacing pulses using the delay time interval.

2. The apparatus of claim 1, wherein the at least one sensor includes a mechanical sensor adapted to sense mechanical events.

3. The apparatus of claim 2, wherein the programmable pulse generator calculates the delay time interval including an atrio-ventricular delay (AVD_S) for optimizing stroke volume.

4. The apparatus of claim 3, wherein the programmable pulse generator determines the AVD_S using a model that maps a PX interval to the AVD_S, wherein the PX interval represents a time interval between an atrial electrical event (P) and an

intracardiac pressure event (X), and wherein the programmable pulse generator generates or detects P, and the mechanical sensor is adapted to detect X.

5. The apparatus of claim 4, wherein the mechanical sensor includes an accelerometer to determine X by sensing heart sounds.

6. The apparatus of claim 4, wherein the mechanical sensor includes a pressure sensor to determine X by measuring left ventricular pressure.

7. The apparatus of claim 6, wherein the pressure sensor is adapted to determine X by detecting an approximate peak of left ventricular presystolic pressure.

8. A method, comprising:

measuring an interval during a systolic cycle between a first event and a second event, the first event related to a paced atrial contraction which is in a first predictable time-dependent relationship and the second event which is in a second predictable time-dependent relationship to a ventricular pacing signal optimally timed for maximum pulse pressure during systole;

generating an atrio-ventricular delay (AVD_s) calculated from a predetermined mapping of a relationship of the interval to an optimal atrio-ventricular delay for maximum pulse pressure during systole; and

delivering a pacing pulse to a ventricle with the generated atrio-ventricular delay (AVD_s),

wherein AVD_s provides an approximation of the optimal atrio-ventricular delay for pacing the ventricle to provide maximum pulse pressure during systole.

9. The method of claim 8, wherein the first event is a paced P-wave, the second event is a peak of left ventricular presystolic pressure (X), and the interval is between the paced P-wave and X (PX).

10. The method of claim 9, where the predetermined mapping is a linear equation, and wherein AVD_s is calculated from the linear equation, using a constant M3 and a constant M4: $AVD_s = M3\ (PX) - M4$.

11. The method of claim 10, further comprising detecting X using pressure transducer.

12. The method of claim 10, further comprising detecting X using a Doppler measurement.

13. The method of claim 10, further comprising detecting X using an accelerometer.

14. An apparatus, comprising:

a programmable pulse generator transmitting ventricular pacing pulses with an atrio-ventricular delay (AVD_s) calculated from an interval measured during a systolic cycle by the programmable pulse generator between a first event and a second event, the first event related to a paced atrial contraction which is in a first predictable time-dependent relationship and the second event which is in a second predictable time-dependent relationship to a ventricular pacing signal optimally timed for maximum pulse pressure during systole,

wherein the AVD_s is calculated by the programmable pulse generator from a predetermined mapping of a relationship of the interval to an optimal atrio-ventricular delay for maximum pulse pressure during systole, and

wherein AVD_s provides an approximation of the optimal atrio-ventricular delay for pacing the ventricle to provide maximum pulse pressure.

15. The apparatus of claim 14, wherein the first event is a paced P-wave, the second event is a peak of left ventricular pressure (X), and the interval is between the paced P-wave and X (PX).

16. The apparatus of claim 15, where the predetermined mapping is a linear equation, and wherein AVD_s is calculated from the linear equation, using a constant M3 and a constant M4: $AVD_s = M3\ (PX) - M4$.

17. The apparatus of claim 16, further comprising a pressure transducer coupled to the programmable pulse generator to detect X, and wherein PX is measured using the programmable pulse generator.

18. The apparatus of claim 16, further comprising a Doppler recorder, coupled to the programmable pulse generator, to detect X, and wherein PX is measured using the programmable pulse generator.

19. The apparatus of claim 16, further comprising an accelerometer, coupled to the programmable pulse generator, to detect X, and wherein PX is measured using the programmable pulse generator.